Claims

1. A method for determining the quality of plant material by determining a chlorophyll fluorescence image of said plant material, wherein the plant material is irradiated with a beam of electromagnetic radiation comprising one or more such wavelengths that at least a part of the chlorophyll present is excited by at least a part of the radiation, the beam of electromagnetic radiation having such a shape that only a small part of the plant material is irradiated, and the beam being moved over the plant material such that a larger part of the plant material is measured, wherein the fluorescence radiation originating from the plant material associated with the chlorophyll transition, is measured with an imaging detector for obtaining a chlorophyll fluorescence image.

2. A method according to claim 1, wherein, in any given order,

during a certain duration of time several fast scans are made over the plant material with the electromagnetic beam for obtaining a chlorophyll fluorescence image Ffast, and

during a certain duration of time a slow scan is made over the plant material with the electromagnetic beam for obtaining a chlorophyll fluorescence image Fslow, and subsequently

the characteristic chlorophyll fluorescence image that is a measure for the efficiency of the photosynthetic system of plant material is calculated from the chlorophyll fluorescence images Ffast and Fslow.

3. A method according to any one of the preceding claims, the characteristic chlorophyll fluorescence image containing information about the quantum efficiency of the photosynthetic activity of the photosynthetic system of the plant material and this image being calculated with the formula

IQP = (Fslow-Ffast)/Fslow

4. A method according to any one of the preceding claims, the beam having the shape of a thin line.

5. A method according to any one of the preceding claims, the beam being moved such over the plant material that the entire surface of the plant material is irradiated.

6. A method according to any one of the preceding claims, the electromagnetic radiation used for irradiating the plant material having a wavelength of between 200 and 750 nm.

7. A method according to any one of the preceding claims, the electromagnetic radiation used for irradiating the plant material being generated by a lamp, laser of LED-lamp.

8. A method according to any one of the preceding claims, the fluorescence radiation originating from the plant material being measured between 600 and 800 nm.

9. A method according to any one of the preceding claims, the fluorescence radiation originating from the plant material being measured with an electronic camera consisting of a video camera, CCD-camera, line scan camera or a number of photodiodes or photomultipliers.

10. A device for determining the quality of plant material using the method according to any one of the claims 1-9, comprising first means for irradiating the plant material with a beam of electromagnetic radiation comprising one or more such wavelengths that at least a part of the chlorophyll present in the plant material is excitated, first means for scanning the beam of

electromagnetic radiation over the plant material with a high scan frequency, first means for measuring the fluorescence radiation originating from the plant material for obtaining a chlorophyll fluorescence image (Ffast) associated with the fast scan, second means for irradiating the plant material with a beam of electromagnetic radiation comprising one or more such wavelengths that at least a part of the chlorophyll present in the plant material is excitated, second means for scanning the beam of electromagnetic radiation over the plant material with a low scan frequency, second means for measuring the fluorescence radiation originating from the plant material for obtaining a chlorophyll fluorescence image (Fslow) associated with the slow scan and means for processing the chlorophyll fluorescence images.

11. A device according to claim 10, the first and second means for irradiating the plant material consisting of the same laser wherein the laser line is scanned with a high frequency and a low frequency, respectively, over the plant material, the first and second means for measuring the chlorophyll fluorescence images consisting of a camera connected to a computer and the means for processing the fluorescence images consisting of a computer provided with software for processing the chlorophyll fluorescence images of the fast and the slow scan.

12. A method for separating plant material consisting of individual components into several fractions each having a different quality, wherein a characteristic parameter is determined for each component using the method according to any one of the claims 1-9 or the device according to claim 10 or 11 and the fractions of components having the characteristic parameter in the same pre-determined range are collected.

13. A method according to claim 12, the plant material consisting of plants, cut flowers, leaf material, fruits, berries, vegetables, flowers, flower organs, roots, tissue culture, seeds, bulbs, algae, mosses and tubers of plants.

14. A method according to claim 13, each individual component consisting of separate plants, cut flowers, leaf material, fruits, berries, vegetables, flowers, flower organs, roots, tissue culture, seeds, bulbs, algae, mosses and tubers of plants.

15. A device for separating plant material using the method according to any one of the claims 12-14, comprising a supply part for the plant material, a part for the irradiation of the plant material with electromagnetic radiation, a part for the measuring of the fluorescence radiation originating from the plant material for obtaining a fluorescence signal, and a separation part that works on the basis of the signal measured.

16. A method for classifying plant material consisting of individual components into several fractions each having a different quality, wherein a characteristic parameter is determined for each component using the method according to any one of the claims 1-9 or the device according to claim 10 or 11 and the fractions of components having the characteristic parameter in the same pre-determined range are collected.

17. A method according to claim 16, the plant material consisting of plants, cut flowers, leaf material, fruits, berries, vegetables, flowers, flower organs, roots, tissue culture, seeds, bulbs, algae, mosses and tubers of plants.

18. A method according to claim 17, each individual component consisting of individual plants, cut flowers, leaf material, fruits, berries, vegetables, flowers, flower organs, roots, tissue culture, seeds, bulbs, algae, mosses and tubers of plants.

19. A device for classifying plant material using the method according to any one of the claims 16-18, comprising a moving structure for localising the plant material, a part for the irradiation of the plant material with a beam of

electromagnetic radiation, a part for the measuring of the fluorescence radiation originating from the plant material for obtaining a fluorescence signal and a classification part that works on the basis of the signal measured.